

SFO – EXPLORATIONS OF THE SENSORIAL FUNCTION OF THE EYE

105th Congress of the Ophthalmologic French Society

May 9th- 13th 1999
PALAIS DES CONGRES
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POSTERS
DAYS OF FUNDAMENTAL AND CLINICAL RESEARCH

A140

Experimental study on the intra-ocular penetration of ammonia.

Is there a delay for the external ocular rinsing in case of serious ocular burns due to bases ?

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Introduction : This experimental study represents the continuity of our clinical prospective study (presented during the SFO Congress in 1996) that counted a delay superior to 30 minutes for the external ocular rinsing for all serious ocular burns due to ammonia. As a consequence, its aim is to find experimental arguments in favor of the following hypothesis : an external ocular rinsing proceeded before a delay of several minutes permits to avoid that an ocular burn due to ammonia becomes serious.

Materials and Methods : The experimental study was realised on 23 New Zealand albino rabbits corneas . Under general anaesthesia, we put a pH meter probe in the anterior chamber in order to measure the aqueous humour pH continuously. Afterwards, we apply 100µl of 15.3% ammonia on the cornea during 1 minute. According to the experiment, rinsings were realised in a blind way either with 250cm³ of physiological serum, or with 250 cm³ of Diphotérine[®], after delays of 1, 3, 10 and 30 minutes. A puncture of the anterior chamber is realised either directly after the rinsing, or 7 minutes after the end of the rinsing in order to measure the ammonia concentration. Then, a sampling of the cornea is realised which permits an anatomopathologic analysis in a blind way.

Results : An increase of the pH exists 1 to 3 minutes after the ammonia application, followed by an important maximum increase of the pH after 6 minutes, occurring after 2 climbings undercut by a stage, and then a decrease with a return to a physiological pH after 30 minutes. The intracamerular concentration in ammonia remains weak after 30 minutes.

Discussion : This study shows the efficiency of the rinsings with Diphotérine[®] during the 5 to 10 minutes after the application of ammonia, from biochemical arguments : inflexion of the pH curve during the rinsing, but also from histological arguments : absence of stromal oedema.

Conclusions : We experimentally underline the interest of a rinsing with Diphotérine[®] in the first minutes following an ocular burn due to bases. We also show the possibility to measure the density of intra-ocular proteins consumed by ammonia. This permits to open interesting ways of research : to correlate the pK of a base with its potential dangerousness on the ocular tissues.